

### **Claims**

1. A method for gathering data related to genetic factors that influence longevity, the method comprising:
  - 5           amplifying a segment of DNA from a subject in a region between the genetic markers D4S1564 and D4S1572 on human chromosome 4; and
  - comparing the segment to a reference sequence.
2. A method for gathering genetic information related to factors that influence longevity, the  
10   method comprising:
  - genotyping a segment of DNA from a subject in a region between the genetic markers D4S1564 and D4S1572 on human chromosome 4; and
  - comparing the segment to a reference sequence.
- 15   3. The method of claim 1 or 2 wherein the reference sequence is from a reference subject who has attained a reference age.
4. The method of claim 3 wherein the reference age is old age.
- 20   5. The method of claim 3 wherein the reference subject has attained at least 91 years of age.
6. The method of claim 5 wherein the reference subject has attained at least 95 years of age.
7. The method of claim 6 wherein the reference subject has attained at least 98 years of age.
- 25   8. A method of evaluating a subject, the method comprising:
  - amplifying a segment of DNA from a subject, wherein the segment is located between the genetic markers D4S1564 and D4S1572 on human chromosome 4; and
  - comparing the amplified segment to a corresponding segment amplified from a relative of  
30   the subject who has attained a reference age.

9. The method of claim 8 wherein the reference age is old age.

5 10. The method of claim 8 wherein the relative of the subject has attained at least 91 years of age.

11. The method of claim 10 wherein the relative of the subject has attained at least 95 years of age.

10 12. The method of claim 11 wherein the relative of the subject has attained at least 98 years of age.

13. The method of claim 8 wherein the relative is a sibling.

15 14. The method of claim 1, 2, or 8 further comprising evaluating the subject for Alzheimer's disease, cancer, or ocular disease.

15. The method of claim 1, 2, or 8 further comprising evaluating the subject for a heart disease, cardiovascular disease, or stroke.

20

16. A method of evaluating a subject, the method comprising:

genotyping a segment of DNA from a subject, wherein the segment is located between the genetic markers D4S1564 and D4S1572 on human chromosome 4; and  
evaluating the subject for Alzheimer's disease, cancer, or ocular disease.

25

17. The method of claim 1, 2, 8, or 16 wherein the segment is in a region between 108.0 to 112.6 cM on human chromosome 4.

18. The method of claim 17 wherein the segment is in a region between 108.0 to 109.0 cM on  
30 human chromosome 4.

19. The method of claim 17 wherein the segment is in a region between 109.0 to 112.6 cM on human chromosome 4.

5 20. A method for gathering data related to genetic factors that influence longevity, the method comprising:

identifying a subject as a subject who has attained a reference age;

amplifying a segment of DNA from a subject in a region between the genetic markers D4S1564 and D4S1572 on human chromosome 4; and

10 recording genetic information about the amplified segment.

21. A method for gathering data related to genetic factors that influence longevity, the method comprising:

identifying a plurality of human subjects who have attained a reference age;

15 amplifying a segment of DNA from each of the subjects, the segment comprising the genetic markers D4S1564 on human chromosome 4; and

recording genetic information about the amplified segment from each of the subjects.

22. A method of mapping a genetic locus that affects longevity, the method comprising:

20 identifying a plurality of sibships in which at least two human siblings have attained a reference age;

genotyping DNA samples for a plurality of markers from each individual of the sibship;

and

determining a LOD score for each marker of the plurality of markers.

25

23. The method of claim 20, 21, or 22 wherein the reference age is an old age.

24. The method of claim 22 wherein at least one sibling is at least 95 years old if female and 91 years old if male.

30

25. The method of claim 22 wherein at least one sibling has attained 98 years of age.

26. The method of claim 24 wherein at least another sibling is at least 95 years old if female and 91 years old if male.

5

27. The method of claim 22 wherein the genotyping comprises genotyping using a plurality of markers on each chromosome.

28. The method of claim 22 wherein the method comprises a multipoint non-parametric analysis.

10

29. The method of claim 22 wherein the method comprises evaluating one or more of the individuals of the plurality of sibships for Alzheimer's disease, cancer, or ocular disease.

30. The method of claim 22 wherein the method comprises evaluating one or more of the individuals of the plurality of sibships for heart disease, cardiovascular disease, or stroke.

15

31. A method of mapping a genetic locus that affects longevity, the method comprising:  
providing nucleic acid samples from a population of human individuals who have attained a predetermined age; and

20

performing an association study that evaluates association between one or more genetic markers with an affected state of individuals in the population.

32. The method of claim 31 wherein the one or more markers are located on human chromosome four.

25

33. The method of claim 31 wherein the one or more markers are located on human chromosome four between D4S1564 and D4S1572.

34. The method of claim 31 wherein the predetermined age is 91 years if male and 97 years if female.

30

35. The method of claim 31 wherein the affected state is ability to live to the predetermined age.

36. The method of claim 31 wherein the affected state is Alzheimer's disease.

5

37. The method of claim 31 wherein the affected state is ocular disease.

38. The method of claim 31 wherein the affected state is cancer.

10 39. The method of claim 31 wherein the affected state is heart disease, cardiovascular disease, or stroke.